On comparing nonlinear filtering algorithms

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Abstract

In this paper we consider the performance of filtering algorithms, which means algorithms to retrieve the underlying state of a nonlinear system in a causal way. Since for nonlinear systems the optimal filter is computationally prohibitively expensive in general, one faces a trade-off between desired filtering accuracy and computational complexity. In order to ascertain whether a certain more powerful filtering algorithm is worth the computational effort, it is necessary to carefully evaluate the potential benefits. We show that skill scores are a useful concept for this. We compared the performance of a number of filtering algorithms applied to a simple nonlinear system. We also discuss the performance in relation to the required computational resources. In general, higher accuracy requires more cpu-power.